CLAIMS

What is claimed:

1. A method of generating images of a portion of a body, comprising:

introducing a contrast agent into the body;

generating a first set of image data using radiation at a first energy level after the contrast agent is introduced into the body;

generating a second set of image data using radiation at a second energy level after the contrast agent is introduced into the body; and

creating a volumetric composite image using the first and the second sets of image data.

2. The method of claim 1, wherein the contrast agent includes an element selected from the group consisting of holmium, erbium, lanthanum, cerium, praseodymium, neodymium, samarium, europium, terbium, dysprosium, thulium, ytterbium, and lutetium.

3. The method of claim 1, wherein the portion of the body comprises at least a portion of a breast.

4. The method of claim 1, wherein the first energy level is below a k-edge of the contrast agent.

5. The method of claim 1, wherein the second energy level is above a k-edge of the contrast agent.

6. The method of claim 1, wherein the first and the second sets of image data are generated by performing a computed tomography procedure.

7. The method of claim 1, wherein the computed tomography procedure is performed using a cone beam.

8. The method of claim 1, wherein the first and the second sets of image data are generated by performing a MRI procedure.

9. The method of claim 1, wherein the first and the second sets of image data are generated by performing a PET procedure.

10. The method of claim 1, wherein the composite image is created by subtracting the first set of image data from the second set of image data.

11. The method of claim 1, wherein the composite image is created by

modifying the first set of image data;

modifying the second set of image data; and

subtracting the first modified set of image data from the second modified set of image data.

12. The method of claim 11, wherein the steps of modifying comprises applying a logarithmic transform to the first and the second sets of image data.

13. The method of claim 1, wherein the first and the second sets of image data are generated within 5 to 20 microseconds.

14. The method of claim 1, wherein the first and the second sets of image data are generated using one or more imagers.

15. The method of claim 14, wherein the first and the second sets of image data are generated using one imager, the imager having a first line, a second line, a third line, and a fourth line of image elements.

16. The method of claim 15, wherein the generating the first and the second sets of image data comprises:

deactivating the first and the third lines of the image elements and activating the second and the fourth lines of the image elements while applying the radiation at the first energy level; and

activating the first, the second, the third, and the fourth lines of the image elements while applying the radiation at the second energy level.

17. The method of claim 1, wherein the radiation at either or both of the first and the second energy levels are generated using a multi-energy x-ray source assembly.

18. The method of claim 1, wherein the composite image is created by removing a tissue feature, and retaining a feature attributable to the contrast agent.

19. The method of claim 1, wherein the radiation at the first and the second energy levels are generated by switching a x-ray tube voltage between a first and a second levels.

20. The method of claim 1, wherein the radiation at the first and the second energy levels are generated by impinging an electron beam onto a first target material and a second target material, respectively.

21. The method of claim 1, wherein the radiation at the first and the second energy levels are generated by filtering x-rays through a first filter and a second filter, respectively.

22. A system of generating images of a portion of a body after a contrast agent is introduced into the body, the system comprising:

means for generating a first set of image data using radiation at a first energy level after the contrast agent is introduced into the body;

means for generating a second set of image data using radiation at a second energy level after the contrast agent is introduced into the body; and

means for creating a volumetric composite image using the first and the second sets of image data;

wherein the first energy level is below a k-edge of the contrast agent, and the second energy level is above a k-edge of the contrast agent.

23. The system of claim 22, wherein the means for generating the first and the second sets of image data comprises one or more imagers.

24. The system of claim 22, further comprising a x-ray source assembly for generating the radiation at the first and the second energy levels, the x-ray source assembly having one or more target materials.

25. The system of claim 22, wherein the x-ray source assembly comprises a plurality of filters for filtering x-ray.

26. The system of claim 22, wherein the x-ray source assembly comprises a plurality of the target materials.

27. The system of claim 26, wherein the x-ray source assembly further comprises means for generating electrons, and means for impinging the electrons onto one of the plurality of the target materials.

28. The system of claim 27, wherein the means for impinging comprises an electromagnetic field generator for deflecting the electrons such that they impinge onto the one of the plurality of the target materials.

29. A computer product having a set of stored instructions, the execution of which causes a process to be performed, the process comprising:

generating a first set of image data using radiation at a first energy level;

generating a second set of image data using radiation at a second energy level; and

creating a volumetric composite image using the first and the second sets of image data.

30. The computer product of claim 29, wherein the first energy level is below a k-edge of a contrast agent.

31. The computer product of claim 29, wherein the second energy level is above a k-edge of a contrast agent.

32. The computer product of claim 29, wherein the first and the second sets of image data are generated by performing a computed tomography procedure.

33. The computer product of claim 29, wherein the computed tomography procedure is performed using a cone beam.

34. The computer product of claim 29, wherein the first and the second sets of image data are generated by performing a MRI procedure.

35. The computer product of claim 29, wherein the first and the second sets of image data are generated by performing a PET procedure.

36. The computer product of claim 29, wherein the composite image is created by subtracting the first set of image data from the second set of image data.

37. The computer product of claim 29, wherein the composite image is created by

modifying the first set of image data;

modifying the second set of image data; and

subtracting the first modified set of image data from the second modified set of image data.

38. The computer product of claim 37, wherein the steps of modifying comprises applying a logarithmic transform to the first and the second sets of image data.

39. The computer product of claim 29, wherein the first and the second sets of image data are generated within 5 to 20 microseconds.

40. The computer product of claim 29, wherein the first and the second sets of image data are generated using one or more imagers.

41. The computer product of claim 40, wherein the first and the second sets of image data are generated using one imager, the imager having a first line, a second line, a third line, and a fourth line of image elements.

42. The computer product of claim 41, wherein the generating the first and the second sets of image data comprises:

deactivating the first and the third lines of the image elements and activating the second and the fourth lines of the image elements while applying the radiation at the first energy level; and

activating the first, the second, the third, and the fourth lines of the image elements while applying the radiation at the second energy level.

43. The computer product of claim 29, wherein the radiation at either or both of the first and the second energy levels are generated using a mult-energy x-ray source assembly.

44. The computer product of claim 29, wherein the composite image is created by removing a tissue feature, and retaining a feature attributable to the contrast agent.

45. The computer product of claim 29, wherein the radiation at the first and the second energy levels are generated by switching a x-ray tube voltage between a first and a second levels.

46. The computer product of claim 29, wherein the radiation at the first and the second energy levels are generated by impinging an electron beam onto a first target material and a second target material, respectively.

47. The computer product of claim 29, wherein the radiation at the first and the second energy levels are generated by filtering x-rays through a first filter and a second filter, respectively.

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